REMARKS

This Application has been reviewed in light of the Final Office Action mailed July 9, 2010. All pending Claims 1-16 were rejected in the Final Office Action. Claims 1, 5, 6, 10, 11, and 15 are herein amended. Applicants respectfully request reconsideration and allowance of all pending claims.

Rejections under 35 U.S.C. § 112

Claims 1 and 6 were rejected under 35 U.S.C. §112, first paragraph, as failing to comply with the written description requirement. The Examiner alleges that the phrase "without any linear displacement sensors" is not disclosed or suggested in the specification. Applicants disagree. The whole point of Applicants' invention is to determine the linear position or displacement of the vehicle body relative to the vehicle chassis **without using linear displacement sensors** (e.g., height-level or suspension travel sensors), thus eliminating the need to rely on such sensors, because such sensors are often expensive and/or unreliable over time. Although the specification does not use the exact phrase "linear displacement sensors," Applicants submit the specification, as a whole, sufficiently conveys to one or ordinary skill in the art that the inventors had possession of the claimed invention.

However, in order to advance prosecution in a timely manner, Applicants have amended Claim 1 to recite "an analysis entity which is combined with the measuring entity and is operable to determine a momentary vertical distance between the vehicle body relative to the vehicle body using the three linear accelerations and the at least two rotational speeds, and **without using any height-level or suspension travel measurements as input for determining the momentary vertical distance**," and similarly amended each of the other independent claims. Applicants submit that this language complies with the written description requirement of 35 U.S.C. §112, first paragraph. For example, the original specification discloses:

> BACKGROUND
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> [0005] In order to determine the suspension travel or height levels the prior art discloses measuring, in the vicinity of the wheels, a length of a dimension between the chassis and the vehicle body or the change in a position of a measuring point. For example, four-wheeled vehicles always have one such

measuring sensor per wheel or three such measuring sensors, these being designated as height-level sensors in the following.

[0006] However, height-level sensors are relatively expensive and subject to significant stresses during their deployment in a motor vehicle. This is due in particular to adverse mechanical effects e.g. from particles and stones which are swirled up into the region between wheels and vehicle body during travel, and from humidity and temperature fluctuations.

SUMMARY

[0007] The present invention addresses the problem of specifying an arrangement and a method which allow a reliable and economical determination of a relative movement of a chassis and a vehicle body of a wheeled vehicle, said vehicle body being movably connected to the chassis.

[0008] In order to determine a relative movement of a chassis and a vehicle body of a wheeled vehicle, said vehicle body being movably connected to the chassis, it is proposed [0009] within the wheeled vehicle to measure three respectively perpendicular linear accelerations of the wheeled vehicle and at least two rotational speeds, each relating to a rotational movement or a component of a rotational movement about a coordinate axis of the wheeled vehicle, wherein the at least two coordinate axes run perpendicularly to each other, and [0010] to determine a momentary movement position of the relative movement using the three linear accelerations and the at least two rotational speeds (in particular repeated).

(Specification, page 2)

[0021] As a result of using the at least two rotational speeds and the three accelerations of the vehicle, it is also possible to establish the relative movement between the vehicle body and the chassis without height-level sensors. This also applies when cornering and/or when traveling on inclined roadways or inclined subsurfaces (inclined laterally and/or forwards).

[0022] It is possible to economize at least part of the cost-intensive height-level sensors. On the other hand, the sensors for measuring the linear accelerations and rotational speeds can also be used for other purposes (e.g. as input variables for further electronic systems such as an anti-blocking system or the electronic stability program). Moreover, it is possible to monitor existing height-level sensors with regard to reliably determining the suspension travel and/or the height positions. If the height-level sensors temporarily supply implausible measured values, it can be decided--perhaps using further measured variables (e.g. travel speed, angle of lock)--whether systems which use the height levels as input variables can still be operated. For example, it might be decided that the height levels (or equivalent variables) which are determined in the manner according to the invention can still be used, since the height-level sensors were disrupted by environmental influences.

(Specification, page 6)

Accordingly, Applicants respectfully request that the rejections under 35 U.S.C. §112, first paragraph (written description), be withdrawn.

Rejections under 35 U.S.C. §103

Claims 1 stands rejected under 35 U.S.C. §103(a) as being unpatentable over *Townend* (U.S. Patent No. 5,475,593) in view oh *Algrain* (U.S. Patcnt No. 5,124,938).

Claims 2-16 stand rejected under 35 U.S.C. §103(a) as being unpatentable over *Townend* in view of *Algrain* and further in view of *Schiffmann* (U.S. Patent No. 6,292,759).

The Examincr alleges argues:

> ... Algrain teaches in at least abstract, wherein Algrain uses three perpendicular lincar accelerations of the wheeled vehicle and at least two rotational movement to determine the movement position of the relative movement (wherein the apparatus uses linear or angular accelerometers to derive the roll, pitch and yaw components and bases on the calculations of angular velocity or acceleration of the vehicle and current rate and angle of rotation of the device, the apparatus generates setpoint and movement commands). Applicant is reminded that claims are given their broadest reasonable interpretation and therefore, examiner believes cited references still read on the argued limitation. Applicant does not explicitly point out how his invention is distinguished from the cited prior art. Applicant must point out how his invention is distinguished from the cited prior art in a more detailed manner.

(Office Action, pages 8-9)

Applicants disagree with the Examiner's interpretation of *Algrain* with respect to the claims as previously presented. In particular, Applicants do not agree that *Algrain* teaches "determin[ing] a ***momentary movement position*** of a relative movement" wherein the momentary movement position "is a measure for ***a distance between the vehicle body and at least one wheel of the chassis***," as previously recited in Claim 1. *Algrain* teaches generating setpoint and movement commands for rotating a sensing device (e.g., camera, radar, or navigation device) mounted on a vehicle (e.g., an airplane) such that a line of sight of the sensing device is stabilized during linear and/or angular movement of the vehicle. (*Algrain* Abstract; col. 1, lines 7-19). However, *Algrain*'s technique does not include determining a **momentary distance between two bodies**, much less a momentary distance between a

vehicle body and at least one wheel of the chassis, as previously recited in Claim 1. Indeed, *Algrain* is directed to use in an airplane in particular, which by nature does not have a body that moves relative to a chassis (at least not during flight). Thus, *Algrain*'s technique is not particularly applicable to the claimed invention, and does not teach the limitations of "determin[ing] a *momentary movement position* of a relative movement" wherein the momentary movement position "is a measure for *a distance between the vehicle body and at least one wheel of the chassis.*"

However, in order to advance prosecution in a timely manner, Applicants have amended the independent claims to more clearly and explicitly distinguish from the cited references. For example, amended Claim 1 recites

> 1. An arrangement for **determining a vertical movement of a vehicle chassis relative to a vehicle body** of a wheeled vehicle, said vehicle body being movably connected to the chassis, comprising
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> - a measuring entity arranged in the wheeled vehicle, wherein the measuring entity is configured to measure three respectively perpendicular linear accelerations of the wheeled vehicle and at least two rotational speeds, each relating to a rotational movement or a component of a rotational movement about a coordinate axis of the wheeled vehicle, wherein the at least two coordinate axes run perpendicularly to each other, and
>
> - an analysis entity which is combined with the measuring entity and is operable to **determine a momentary vertical distance between the vehicle body relative to the vehicle chassis using the three linear accelerations and the at least two rotational speeds, and without using any height-level or suspension travel measurements as input for determining the momentary vertical distance**,
>
> - wherein the analysis entity comprises a calculating unit which is operable to calculate a plurality of the momentary vertical distances using the at least two rotational speeds and the three linear accelerations.

Thus, amended Claim I clearly recites determining a ***momentary vertical distance between a vehicle body relative to a vehicle chassis*** using the three linear accelerations and the at least two rotational speeds, and ***without using any height-level or suspension travel measurements as input for determining the momentary vertical distance***. As discussed above, by calculating the suspension travel without using height-level or suspension travel

measurements, the need to rely on sensors that directly measure height-level or suspension travel can be avoided. This is advantageous, for example, because such sensors are often expensive and/or unreliable over time.

Townend and *Algrain* do not teach determining a momentary vertical distance between a vehicle body relative to a vehicle chassis without using any height-level or suspension travel measurements as input for determining the momentary vertical distance. First, *Townend* uses height-level or suspension travel measurements -- specifically, **actuator displacement signals (X1, X2, X3, X4)** at each wheel -- as input for its analysis. For example, *Townend* teaches:

> In a first preferred embodiment the first control device generates control signals using signals generated by **sensors measuring displacement** of and forces on the vehicle body in a first model of a spring and damper system and the second control device generates control signals using the signals generated by the sensors in a second model of a spring and damper system.
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> *(col. 2, lines 48-54)*
>
> Each of the corner processors, 100, 200, 300 and 400 sends to the central processor 500 **signals indicative of actuator displacement (X1,X2,X3,X4)** and force measured by the load cell (F1,F2,F3,F4), as can be seen in FIG. 2. The central processor 500 returns to each of the corner processors three demand signals;
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> *(col. 4, lines 43-48)*
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> The central processor resolves the signals it receives into modal calculations. **The central processor 500 considers the forces acting on the vehicle and the resulting displacements** of the vehicle as comprising four different types, **heave**, pitch, roll and warp. Displacements arising from modal forces are shown in FIGS. 3a,3b, 3c and 3d.
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> FIG. 3a shows **heave displacement, which is displacement directly upwardly and downwardly of the vehicle body**. The processor considers a downward heave displacement to be a positive heave.
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> *(col. 4, lines 58-67)*
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> **X1,X2,X3X4 = measured actuator displacements.**
>
> *(col. 6, line 4)*

Thus, *Townend*'s analysis is clearly not performed "without using any height-level or suspension travel measurements as input for determining the momentary vertical distance," and in fact *Townend* teaches away from this key feature of Applicants' claims.

Second, *Algrain* does not teach determining a ***momentary vertical distance between a vehicle body relative to a vehicle chassis***. As discussed above, *Algrain*'s technique is directed to use in an airplane, which by nature does not have a vehicle body that moves relative to a vehicle chassis (at least not during flight). Thus, *Algrain*'s technique is not particularly applicable to the claimed invention. Specifically, *Algrain* does not teach **determining a vertical distance** between *any* two bodies, much less determining a vertical distance between a vehicle body relative to a vehicle chassis, as recited in amended Claim 1.

Thus, for at least the reasons presented above, Applicants respectfully submit that the amended independent Claims 1, 6, and 11 are clearly distinguished from *Townend* and *Algrain*. Accordingly, Applicants request reconsideration and allowance of amended independent Claims 1, 6, and 11, as well as all dependent claims.

CONCLUSION

Applicants have made an earnest effort to place this case in condition for allowance in light of the remarks set forth above. Applicants respectfully request reconsideration of the pending claims.

Applicants respectfully submit a Request for Continued Examination (RCE) Transmittal. The Commissioner is authorized to charge the fee of $810 required to Deposit Account 50-4871 in order to effectuate this filing.

Applicants believe there are no other fees due at this time, however, the Commissioner is hereby authorized to charge any fees necessary or credit any overpayment to Deposit Account No. 50-4871 of King & Spalding L.L.P.

If there are any matters concerning this Application that may be cleared up in a telephone conversation, please contact Applicants' attorney at 512.457.2030.

Respectfully submitted,
KING & SPALDING L.L.P.
Attorney for Applicants

Eric M. Grabski
Registration No. 51,749

Date: 9/30/10

SEND CORRESPONDENCE TO:
KING & SPALDING L.L.P.
CUSTOMER ACCOUNT NO. **86528**
512.457.2030
512.457.2100 (fax)